development of the nerves. It is open for consideration whether the absence of anterior roots to the cranial nerves may not furnish such a limit, this would be very convenient for morphology. *Nature*, Aug. 30, 1877.

CEREBRAL LOCALIZATIONS.—The following are the conclusions of a communication by Dr. W. H. Broadbent, of London, to the International Medical Congress at Geneva, Switzerland, (Sept. 9–15) as reported in the *Gaz. des Hopitaux*, No. 130, 1877:

1. *Motor zone of the cerebral cortex.* 1. The physiological experiments, based either upon electrical excitation or upon destruction or ablation, practised by Hitzig, Ferrier, Carville and Duret, Nothnagel and others, have established the fact that there exists a certain zone in the cortical portion of the cerebral hemispheres, which is in intimate relation with the nuclei of the motor nerves, of the medulla and spinal cord.

This zone is situated in the ape and in man, around the fissure of Rolando, and principally in the two marginal or ascending convolutions which border on this groove.

At this horizon exist regions, more or less defined and circumscribed, specially related to the leg, the arm, the face, etc.

2. The pathology of this zone accords in a very remarkable manner with the results of physiological experimentation.

Partial or irritant lesions may produce partial epilepsy, with or without transient or permanent hemiplegia.

More extensive lesions, with more or less complete destruction of the gray cortical substance, may cause a monoplegia or hemiplegia.

3. While admitting the localization of a motor zone, and of motor centres on the surface of the hemisphere, it ought to be added that the communication between the cells of this region and those of the anterior horns of gray matter cannot be a direct one.

The co-ordinated character and the sequence or succession of the movements which are provoked by the electrical excitation, the character of the paralysis produced by the ablation of a cortical centre, its intermittence, short duration, the tendency of the partial symptomatic epilepsy to commence in the hand, although the situation of the lesion may be different, the loss of time in the transmission of an electric excitation, are so many reasons for the supposition of a ganglion between the cerebral cortex, and the roots of the motor nerves.

The cortical motor centres are the points of departure for the descending voluntary impulses, the starting places for ideo-motor actions. The cells of the motor zone (which resemble those of the anterior horns of the cord) are the apparatuses by which the dictates of the intelligence are formulated for expression or for transmission outwards.

The best example of the action of a motor centre is afforded by the centre for speech, which was the first and the most important of the cerebral localizations. Aphasia without paralysis of the lips or tongue, is an example of what we call vicarious supply, or functional substitution, although as such it is incomplete.

4. According to the experiments of Ferrier and Hitzig, there exists in the vertical portion of the cortex a centre for perception.

This zone extends from the angular gyrus, which is the visual perceptive centre, along the sub-sylvian convolution of the temporo-sphenoidal lobe (in which is found the centre for audition) to the point of this lobe.

Thence the zone returns through the lobuli and the unciform gyrus, of which it occupies the internal border, towards the occipital lobe in which it probably occupies the calcarine gyrus.

Pathology has not yet furnished precise indications in regard to this question. We know, nevertheless, that complete destruction of the occipital lobe is without effect on sensibility.

5. The convolutions of the frontal and occipital lobes, those of the insula, those of the internal face of the hemispheres, those of the suborbital lobule, do not respond to electrical excitations. Lesions of these parts of the cortex do not have constant results, and are, for the most part, without effect.

The ablation of the two frontal lobes appears to diminish the spontaneity and activity of the intelligence; that of the occipital extremity of the hemispheres seems to abolish the appetite, but these effects do not afford any satisfactory idea of the functions of these lobes.

6. There appears to be no special cerebral vaso-motor centre; the vaso-motor apparatus is in relation with the general motor system, and, like it, has its centres in the cord, in the central ganglia and in the convolutions, these centres are subordinate one to another.

In the same way there are neither centres nor special trophic nerves. Trophic influence is common to the whole nervous system.

II. *Opto-striate bodies.* 1. The corpus striatum certainly exercises a motor function; a great part of the motor fibres of the foot of the cerebral peduncle terminate in this ganglion. Faradic excitation of the corpus striatum causes general contraction of all the muscles of the opposite side of the body; its experimental or pathological destruction causes hemiplegia.

It is, according to the author, the intermediary between the hemisphere and the cord. Its cells, grouped and combined by the sensory-motor education, are the apparatuses by which the cortico-motor centres transmit their orders to the muscles.

2. The optic thalamus is an intermediary ganglion for the transmission of sensory impressions from the nuclei of the sensory nerves to the perceptive centres of the cerebral cortex. In spite of the numerous objections that may be raised, this interpretation has in its favor the results of experimentation and of pathological anatomy. If the localization of the perceptive centres is correct, it is anatomically impossible, according to the researches of the author, that there should be any other route of communication between the hemispherical bundles than through the optic thalamus. The facts of hemianæsthesia are perfectly in accord with this hypothesis.

The opto-striate bodies are therefore instruments of the hemispheres, and also an automatic apparatus.

As a general interpretation of symptoms, furnished by this manner of view, we may say that:

(*a*) *Paralysis* is due to a rupture, either of cells or fibres, belonging to the mechanism of the motor nervous apparatus.

(*b*) *Anæsthesia* is due to a rupture in the sensory nervous mechanism.

(*c*) *Tremor* is the effect of a hindrance in the conductibility of the white fibres.

(*d*) *Convulsions* (including those of chorea) are the result of an irritation of the gray substance.

(*e*) *Precocious* and *transitory contractures* are the effect of pressure on a ganglion.

Since the entire nervous system is a vast mechanism of cells and fibres, its functional action ought to be described in terms of cells and fibres, we thus avoid the ambiguities so hurtful to progress, and obtain a true physiological localization.

In some remarks on Dr. Broadbent's communication, Prof. Schiff stated his opinion that the true motor centres are not directly excitable by electrical, chemical, or mechanical irritation, and that the only means to determine the function of any part of the brain was by extirpation. He had extirpated the motor centre for the face in dogs; the movements were preserved, but tactile sensibility was abolished, and from the phenomena here observed he concluded that the so-called motor centres were only centres for tactile sensibility. He had made this the subject of experiments, the results of which he had given in the second edition of his *Lecons sur l'Encephale.* These conclusions are perhaps not applicable to man, who, with his superior organization, may perhaps have motor centres on the surface of the brain.

THE INFLUENCE OF CENTRIFUGAL ACTION ON THE CIRCULATION OF THE BRAIN.—M. Salathé reported to a recent meeting of the Paris Academy of Sciences, the results of some experiments performed by him to test the effects of position and centrifugal forces on the condition of the blood supply of the brain in rabbits, He found that if he suspended a rabbit, head downward, even for many hours, death did not ensue, but it was certain to follow rapidly the suspension of the animal in the opposite position, with the head upward. Death was due in this case to cerebral anæmia.

If the rabbit was placed on a rapidly turning plane, it succumbed to either cerebral congestion or anæmia, according as its head was directed toward the periphery or toward the centre of the turning plane. If it was fastened laterally, no serious consequences followed.

The following are the titles of some other recent papers on the Anatomy and Physiology of the Nervous System:

LAUTENBACH, On the Functions of the Cerebral Lobes, *Am. Jour. Med. Science*, October, 1877; WALSH, The Anatomy of the Brachial Plexus,